

## Vibration of conductors when passing pulsed electric current through them and non-destructive testing

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*The article considers the features of passing pulsed electric current through a conductor. It is accompanied by the occurrence of conductor vibration, which can be used to control the absence of damage in the conductor and its fastening elements. The pulsed electric current creates its own magnetic field, and interacts with it, causing vibration and deformation of the conductor, which leads to the formation of damped vibration processes. Vibrational and magnetodynamic processes in samples of copper, gold, silver, brass, steel and titanium have been experimentally studied. It is shown that the formation of vibro-acoustic processes is correlated with the moments of the beginning and the end of the passing pulsed electric current. Based on the results of the analysis of the experimental data, the dependence of vibrational oscillation amplitude on the current magnitude or density is found to be close to linear. It is established that the dependence of the vibrational oscillations amplitude on the duration of the electric current pulse indicates the presence of a rise in the region of relatively small pulse durations, which corresponds to adding up counterphase oscillations formed at the leading and trailing edges of the electric current pulse. The results of the investigation of the vibrational response to the passing pulsed electric current for various materials and pulse parameters are presented. The capability of such vibrations and related deformation processes when controlling the parameters of pulsed electric current are studied. The obtained results can be used in devices for electroplastic processing metals and at construction of nondestructive means of testing powerful electrical equipment elements.*

**Keywords:** conductor, pulsed electric current, deformation, vibration, pinch effect, non-destructive testing

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